UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,531	10/06/2003	Hiroto Sugahara	501558.20003	3968

26418 7590 03/14/2008
REED SMITH, LLP
ATTN: PATENT RECORDS DEPARTMENT
599 LEXINGTON AVENUE, 29TH FLOOR
NEW YORK, NY 10022-7650

EXAMINER	
MRUK, GEOFFREY S	

ART UNIT	PAPER NUMBER
2853	

MAIL DATE	DELIVERY MODE
03/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/679,531	**Applicant(s)** SUGAHARA, HIROTO	
	Examiner Geoffrey Mruk	**Art Unit** 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2007*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.
4a) Of the above claim(s) *7,11-13 and 16-19* is/are withdrawn from consideration.
5)☒ Claim(s) *14,15,20-23,27 and 29* is/are allowed.
6)☒ Claim(s) *1-4,6,10,24,25,28,30 and 32-37* is/are rejected.
7)☒ Claim(s) *5,8,9,26,31,and 38* is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☒ All b)☐ Some * c)☐ None of:
1.☒ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *11/19/07*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 December 2007 has been entered.

Information Disclosure Statement

The references cited in the information disclosure statement (IDS) submitted on 19 November 2007, have been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 10, 24-25, 28, 30, and 32-37 are rejected under 35 U.S.C. 102 (b) as being anticipated by August et al. (US 4,350,916).

With respect to claim 1, August discloses a pressure producing apparatus, comprising:

- a sheet member (Fig. 2, element 26) which is formed of a piezoelectric material (Column 5, lines 3);
- a plurality of first electrodes (Fig. 2, element 20) which are embedded (Column 4, line 67 - Column 5, line 20) in a first area of one of a first portion and a second portion of the sheet member, such that the first electrodes are separate from each other in the first area, the first portion and the second portion being opposite to each other in a direction of thickness of the sheet member; and
- a plurality of second electrodes (Fig. 2, element 18) which are embedded (Column 4, line 67 - Column 5, line 20) in a second area of said one of the first and second portions of the sheet member, such that the second electrodes are separate from each other in the second area, the second area being adjacent to the first area in a surface direction parallel to one of a first surface of the first portion and a second surface of the second portion (Fig. 1, elements 18 and 20), the first surface and the second surface being opposite to each other in the direction of thickness of the sheet member (Fig. 2).

With respect to claim 2, August discloses the first electrodes (Fig. 2, element 20) and the second electrodes (Fig. 2, element 18) are embedded (Column 4, line 67 - Column 5, line 20) in said one of the first and second portions of the sheet member, such that the first electrodes and the second electrodes extend from said one of the first and second surfaces of the first (Fig. 1, elements 18 and 20) and second portions (Fig. 1, elements 18 and 20) of the sheet member (Fig. 2, element 26) in the direction of thickness thereof.

With respect to claim 3, August discloses a plurality of portions of said one of the first (Fig. 2, element 26, i.e. bottom portion) and second portions (Fig. 2, element 26, i.e. top portion) of the sheet member (Fig. 2, element 26) that are located between the plurality of first electrodes (Fig. 2, element 20) and said the plurality of second electrodes (Fig. 2, element 18) is are polarized in the surface direction, so as to provide a plurality of active portions, and wherein when an electric field (Column 4, lines 54-61) is applied to each of the active portions of the sheet member in a same direction as the direction of polarization of the said each active portion, the sheet member is curved in the direction of thickness thereof because of a difference between an amount of elongation in the surface direction of said one of the first and second portions of the sheet member are provided and an amount of elongation in the surface direction of the other of the first and second portions (Column 5, lines 16-24).

With respect to claim 4, August discloses the first (Fig. 2, element 20) and second electrodes (Fig. 2, element 18) are embedded (Column 4, line 67 - Column 5, line 20) in a limited portion of said one of the first and second portions of the sheet member that is limited in the surface direction (Fig. 1, elements 18 and 20).

With respect to claim 6, August discloses the first electrodes (Fig. 2, element 20) comprise a plurality of groups of said first electrodes and the second electrodes (Fig. 2, element 18) comprise a plurality of groups of said second electrodes, wherein the plurality of groups of first electrodes are arranged along a plurality of first straight lines as a plurality of said first lines, respectively, and the plurality of groups of second electrodes are arranged along a plurality of second straight lines as a plurality of said second lines, respectively, and wherein the groups of first electrodes and the groups of second electrodes are alternate with each other in a direction intersecting the first and second straight lines (Fig. 1, elements 18 and 20).

With respect to claim 10, August discloses the first portion of the sheet member (Fig. 2, element 26, i.e. bottom portion) comprises a first sheet member (Fig. 2, element 26) and the first electrodes (Fig. 2, element 20) are embedded in the first sheet member, wherein the second electrodes (Fig. 2, element 18) are embedded in the first sheet member (Fig. 2, element 26) and wherein the second portion (Fig. 2, element 26, i.e. top portion) of the sheet member comprises a second sheet member (Fig. 2, element 24) which is stacked on the first sheet member and resists elongation of the first sheet member in the surface direction that occurs when an electric field is applied, in the surface direction, to a plurality of portions of the first sheet member that are located between said at least one first electrodes least one the second electrodes (Column 4, lines 54-61).

With respect to claim 24, August discloses the plurality of first electrodes (Fig. 2, element 20) comprise a plurality of groups of first electrodes each group of which include at least two first electrodes and are embedded (Column 4, line 67 - Column 5, line 20) in a corresponding one of a plurality of said first areas of said one of the first portion and the second portion of the sheet member (Fig. 2, element 26), such that said at least two first electrodes are separate from each other in said corresponding first area, and the plurality of second electrodes (Fig. 2, element 18) comprise a plurality of groups of second electrodes each group of which includes at least two second electrodes and are embedded (Column 4, line 67 - Column 5, line 20) in a corresponding one of a plurality of said second areas of said one of the first and second portions of the sheet member, such that said at least two second electrodes are separate from each other in said corresponding second area, and wherein the plurality of first areas and the plurality of second areas are arranged alternately with each other in the surface direction (Fig. 1, elements 18 and 20).

With respect to claim 25, August discloses each of the plurality of first areas and the plurality of second areas has an elongate shape (Fig. 1, elements 18 and 20).

With respect to claim 28, August discloses the first electrodes (Fig. 2, element 20) are arranged along a first line in the first area and the second electrodes (Fig. 2, element 18) are arranged, in the second area, along a second line which is separate from, and opposed to, the first line in the surface direction (Fig. 1, elements 18 and 20).

With respect to claim 30, August discloses each of the first and second electrodes (Fig. 1, elements 18 and 20) has a columnar shape (Fig. 1, elements 18 and 20) having a substantially constant cross-section area (Fig. 1, elements 18 and 20) in a direction parallel to an axis line thereof, and is embedded (Column 4, line 67 - Column 5, line 20) in said one of the first and second portions of the sheet member such that the axis line of said each electrode extends substantially parallel to the direction of thickness of the sheet member (Fig. 2, element 26).

With respect to claim 32, August discloses a pressure producing apparatus, comprising: a sheet member (Fig. 2, element 26) which is formed of a piezoelectric material (Column 5, line 3) and which includes a first portion (Fig. 2, element 26, i.e.

bottom portion) and a second portion (Fig. 2, element 26, i.e. top portion) that are opposite to each other in a direction of thickness of the sheet member and have a first surface and a second surface, respectively, that are opposite to each other in the direction of thickness of the sheet member; a plurality of first electrodes (Fig. 2, element 20) which are embedded in one of the first portion and the second portion of the sheet member, such that the first electrodes are separate from each other and are arranged along a first line; a plurality of second electrodes (Fig. 2, element 18) which are embedded in said one of the first and second portions of the sheet member, such that the second electrodes are separate from each other and are arranged along a second line which is separate from, and opposed to, the first line in a surface direction parallel to one of the first surface and the second surface of the sheet member (Fig. 1, elements 18 and 20); a first wiring which electrically (Fig. 1, element 16) connects the first electrodes to each other and which is provided outside the sheet member; and a second wiring (Fig. 1, element 14) which electrically connects the second electrodes to each other and which is provided outside the sheet member.

With respect to claim 33, August discloses each of the first wiring (Fig. 1, element 16) and the second wiring (Fig. 1, element 14) is provided on said one of the first surface and the second surface of the sheet member (Fig. 3, elements 34, 36).

With respect to claim 34, August discloses a pressure producing apparatus, comprising: a sheet member (Fig. 2, element 26) which is formed of a piezoelectric material (Column 5, line 3) and which includes a first portion (Fig. 2, element 26, i.e. bottom portion) and a second portion (Fig. 2, element 26, i.e. top portion) that are opposite to each other in a direction of thickness of the sheet member and have a first surface and a second surface, respectively, that are opposite to each other in the direction of thickness of the sheet member; at least three first electrodes (Fig. 2, element 20) which are embedded (Column 4, line 67 - Column 5, line 20) in one of the first portion and the second portion of the sheet member, such that said at least three first electrodes are separate from each other and are arranged along a first line; and at least three second electrodes (Fig. 2, element 18) which are embedded (Column 4, line 67 - Column 5, line 20) in said one of the first and second portions of the sheet member, such that said at least three second electrodes are separate from each other and are arranged along a second line which is separate from, and opposed to, the first line in a surface direction parallel to one of the first surface and the second surface of the sheet member; wherein each of said at least three first electrodes and said at least three second electrodes has a columnar shape having a substantially constant cross-section area in a direction parallel to an axis line thereof (Fig. 2, elements 18 and 20), and is embedded in said one of the first and second portions of the sheet member such that the axis line of said each electrode extends substantially parallel to the direction of thickness of the sheet member (Fig 2, element 26).

With respect to claim 35, August discloses at least six said first electrodes (Fig. 2, element 20) are arranged along at least two said first lines which are separate from each other in the surface direction (Fig. 1, element 20), such that said at least three first electrodes are arranged along each of said at least two first lines, and at least six said second electrodes (Fig. 2, element 18) are arranged along at least two said second lines which are separate from, and alternate with, said at least two first lines in the surface direction (Fig. 1, element 18), such that said at least three second electrodes are arranged along each of said at least two second lines; and wherein each of said at least six first electrodes and said at least six second electrodes has the columnar shape (Fig. 2, elements 18 and 20).

With respect to claim 36, August discloses a pressure producing apparatus, comprising: a sheet member (Fig. 2, element 26) which is formed of a piezoelectric material (Column 5, line 3) and which includes a first portion (Fig. 2, element 26, i.e. bottom portion) and a second portion (Fig. 2, element 26, i.e. top portion) that are opposite to each other in a direction of thickness of the sheet member and have a first surface and a second surface, respectively, that are opposite to each other in the direction of thickness of the sheet member (Fig. 2); a plurality of first electrodes (Fig. 2, element 20) which are embedded (Column 4, line 67 - Column 5, line 20) in one of the first portion and the second portion of the sheet member, such that the first electrodes are separate from each other and are arranged along a plurality of first lines which are separate from each other in a first surface direction parallel to one of the first surface (Fig. 1, element 20) and the second surface of the sheet member; and a plurality of second electrodes (Fig. 2, element 26) which are embedded (Column 4, line 67 - Column 5, line 20) in said one of the first and second portions of the sheet member, such that the second electrodes are separate from each other and are arranged along a plurality of second lines which are separate from, and alternate with, the first lines in the first surface direction; wherein the first electrodes (Fig. 1, element 20) are arranged along a plurality of third lines (Fig. 1) which intersect the first lines and are separate from each other in a second surface direction that is parallel to said one of the first and second surfaces of the sheet member and intersects the first surface direction (Fig. 1, element 18); and wherein the second electrodes are arranged along at least one fourth line which is separate from, and alternate with, the third lines in the second surface direction (Fig. 1).

With respect to claim 37, August discloses the first, second, third, and fourth lines are straight (Fig. 1).

Response to Arguments

Applicant's arguments, see pages 16-18, filed 12 December 2007, with respect to the rejection(s) of claim(s) 1-4, 6, 8-10, 20-22, 24, 25, and 27-30 under 35 U.S.C 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of August et al. (US 4,350,916).

Election/Restrictions

Claim 20 is allowable. Claims 14, 15, and 23, previously withdrawn from consideration as a result of a restriction requirement, require all the limitations of an allowable claim. Pursuant to the procedures set forth in MPEP § 821.04(a), **the restriction requirement among species, as set forth in the Office action mailed on 27 April 2005, is hereby withdrawn** and claims 14, 15, and 23 are hereby rejoined and fully examined for patentability under 37 CFR 1.104. In view of the withdrawal of the restriction requirement, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

1. Claims 14, 15, 20-23, 27, 29 are allowed. The primary reasons for allowance for claim 21 is that applicant's claimed invention includes a pressure producing apparatus having a liquid-chamber defining member. It is this limitation, expressed in the claimed combination not found, taught, or suggested in the prior art that makes this claim allowable over the prior art.

2. Claims 5, 8, 9, 26, 31, and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Do-huu et al. (US 4,586,512) discloses an electromechanical transducer having annular grooves (Fig. 1, element 4). However, Do-huu fails to disclose electrodes embedded in a piezoelectric sheet.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is (571)272-2810. The examiner can normally be reached on Monday-Friday 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 2853
2/28/2008

/Stephen Meier/
Supervisory Patent Examiner, Art Unit 2853